



CALS TEST NETWORK

CTN Test Report

92-012

AFTB-ID
92-028



Air Force CALS Test Bed Technical Analysis Report



Tools for Test Bed Procedure Automation



DTIC QUALITY INSPECTED 4



14 September 1992



Prepared for
Air Force Materiel Command

19960826 072

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CTN Test Report
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AFTB Test Report
92-28

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1. Executive Summary

The Air Force CALS Test Bed (AFCTB) testing philosophy has been to incorporate as many different tests (as practical in the testing process) to establish maximum confidence in the interpretation and implementation of CALS Standards. Over time, this has resulted in complex testing procedures with many different steps. These steps consist of software applications, operating systems, and commands; requiring the tester to master them in order to complete the testing and reporting cycle. The purpose of creating the automation procedures in the test bed was to shift the burden of manual command entry and file management by the tester to the automation software. This reduces the time, effort, and expertise required to perform much of the testing and reporting tasks. The result is a networked, multiuser environment functional across the different system platforms found in the AFCTB.

2. Introduction

The AFCTB testing philosophy has been to incorporate as many different tests as practical in the testing process to establish maximum confidence in the interpretation and implementation of CALS Standards. Over time, this has resulted in complex testing procedures with many different steps involving software applications, operating systems, and commands required to complete the testing and reporting.

This report documents an effort to generalize, standardize, automate, and document these testing procedures for use by users less familiar with the process. The tools resulting from this effort are effective ways to increase availability, throughput, and the ease of test performance by prompting the users along the entire process.

The purpose of this report is to document the recent effort in analysis, systems integration, and automation of the test procedures used in the AFCTB to evaluate test file adherence to CALS Standards. Another purpose is to document the testing and reporting activities performed by the AFCTB and other possible facilities operating within similar hardware/software/networking environments. The goal of this effort was to increase the testing resource availability, ease of use, speed, and test/report throughput by the following:

- Enabling resource sharing to the maximum extent possible,
- reducing difficulty and errors by automating and eliminating typing of long, complex, and repetitive commands, data file names and paths to data,
- reducing time, effort, and expertise required to perform a great deal of the testing and reporting tasks (excluding expert interpretation of difficult test results and modification of test data for re-test -- although the automation does not preclude these actions, it does not propose to have knowledge or give advice beyond the errors reported by the testing software applications),
- integrating the entire test and reporting procedure from start to finish and guiding users along who are unfamiliar with all the CALS Standards, hardware platforms, operating systems, command languages, and application software used for testing and reporting, and

- performing integrated file management service for the users from start to finish in a networked, multi-user environment, across the different system platforms and invoking the different networking protocols transparent to users.

This tool automates the test procedures to run TAPETOOL, AUTOCAD, SGML parsers and the other tools by executing a set of C-Shell scripts written in the UNIX C-Shell command language and a set of batch files written in the MS-DOS batch command language. The user starts a top level procedure by typing its name. This procedure and all related sub-procedures invoke the appropriate applications, tape procedures, networking protocols, remote file copying, file transfer, placement of the files in the user's account, and file cleanup.

3. CALS Standards Testing Applications Automated/Integrated

The following are the CALS Standards tests and applications currently automated, integrated, and available per workstation:

<u>CALS Standard</u>	<u>Applications</u>	<u>Resident</u>	<u>/</u>	<u>Availability</u>
MIL-STD-1840A	TAPETOOL	Sun 3/280		All
MIL-D-28000 (IGES)	Rosetta Preview	Sun 3/60		Sun 3/60
	IDA Parser	Cheetah 486 PC		/Comp. PCs
	IDA Verify	Cheetah 486 PC		/Comp. PCs
	CADKEY/IG2C	Cheetah 486 PC		/Comp. PCs
	AUTOCAD	Cheetah 486 PC		/Comp. PCs
MIL-M-28001 (SGML)	Exoterica XGML	Cheetah 486 PC		/Comp. PCs
MIL-R-28002 (Raster)	VALIDG4	Sun		
	VALIDG4	Cheetah 486 PC		/Comp. PCs
	Hijaak	Cheetah 486 PC		/Comp. PCs
	HJ2 Viewer	Cheetah 486 PC		/Comp. PCs
MIL-D-28003 (CGM)	Metacheck/Metacals	Cheetah 486 PC		/Comp. PCs
	Harvard Graphics	Cheetah 486 PC		/Comp. PCs
		Novell Server		/Comp. PCs
QSTR Test Reports	Enable	Novell Server		/Comp. PCs
		Cheetah 486 PC		/Comp. PCs

This table identifies the tools that are currently being utilized in the AFCTB. If your environment uses some or all of these tools, they will be documented in the automated procedures. If your environment has no need for a tool, simply delete those steps from the appropriate procedure. Likewise, to add a new tool to the procedure, model existing steps with the appropriate names.

The networking protocols used were both Telnet (TCP/IP) to the Suns and Novell IPX/SPX providing LAN Client/Server service to PCs running on top of a 10 Mbps Ethernet. If this setup differs from yours, simply replace our network protocols and commands involving file transfer with the appropriate commands that fit your configuration.

Use of the above suite of platforms/software tools and tests greatly helps in establishing confidence in the interpretation and implementation of the CALS Standards whenever the same results are achieved in these different environments. Conversely, different results help flag possible errors in interpretation of the data and help provide feedback to software vendors.

4. Analysis of Previously Existing Test Environment

Analysis of the previously existing test environment resulted in the following findings:

- Access was limited only to those who were very fluent in both DOS and UNIX command language and knew how and where to go to execute commands and how and when to invoke the different networking protocol commands (to transfer files for example).
- Users must be very familiar with the order of running test procedure application programs and be able to navigate from one directory to another, copying appropriate files as they go. Meanwhile, two or more users could not copy files for an application without overwriting each other's files. They must then clean up those files when finished. The LAN File Server was not being fully utilized to access data files in individual user accounts and support a multi-user environment.
- Users must type in most commands by hand and know the names and locations of both data files and executable files including CALS testing applications and other commands such as batch files, with increased chance of errors.

5. Enhancements Enabled Through Integration/Automation Effort

To start with, this automation software is considered to be a Beta Test version and not the final product, utilizing only the software products currently available on the platforms and not yet incorporating other requested utility software. The automation software is not an "end to all ends" in automating CALS testing and reporting, i.e. it DOES NOT do the following:

- invoke analysis and reporting beyond the extent that the CALS applications generate analysis and reports.
- expert analysis and reporting, i.e. interpretation of graphical or text output generated by the applications from the data files.
- automatic correction of errors and re-test. However, it does enable an expert user to modify test data and retest to see the effect.
- currently generate complete test reports (QSTRs). This is a planned enhancement. In any case, the final document may still require expert review and editing. The QSTR document would then also be automatically tagged per its DTD and put into the appropriate database.

It DOES however achieve the following goals:

- Enables increased resource sharing.
- Enables multi-user environment.
- Increases ease of use, speed, and throughput of test data through CALS suites of test.
- Eliminates the need to be knowledgeable of CALS Standards, test procedures, application software (to some extent), operating systems, and networking protocols, from a user who wishes to run tests. Therefore, a large portion of the test cases are made available to, and can be accomplished by, a much larger set of possible users.
- Integrates the entire test and reporting procedure from start to finish and guides the user along.
- Performs integrated file management service for all users.

6. Conclusions

The systems integration and automation effort and software have produced an efficient way to handle increasing flows of CALS test data by enabling more availability and potential throughput. It is believed that continued integration and automation efforts such as this are the tools which will yield higher productivity and growth in these important activities, yet keeping resource requirements under control.

These tools are currently available on 3.5" or 5.25" floppy disk media upon request by contacting the Air Force CALS Test Bed at (513) 257-3085 or DSN 787-3085.